

LISTING OF THE CLAIMS

The following listing of the claims replaces all prior claim listings and versions in the application:

1. – 39. (Canceled)

40. (Currently Amended) A substrate processing system comprising a network having a coupling between a substrate processing apparatus discharging a processing solution onto a rotating substrate to perform predetermined processing, and a computer collecting data from said substrate processing apparatus, said substrate processing system comprising:

a collection part configured to monitor and collect a plurality of control elements in a specific step as one process of said predetermined processing in said substrate processing apparatus; and

an abnormality detection part comprising an abnormality detection program configured to detect a processing abnormality in said substrate processing apparatus based on a combined effect of said plurality of control elements collected by said collection part, the abnormality detection program being configured to detect that a first control element of the plurality of control elements deviates from a first reference value by an amount sufficient to determine a presence of an abnormality, and to determine an absence of the processing abnormality in processing as a whole when a second control element of the plurality of control elements deviates from a respective reference value by a predetermined amount or more and the abnormality detection program determines that effects caused by such deviations compensate each other, and

the abnormality detection program being further configured to permit continuation of the predetermined processing by the substrate processing apparatus based on the determination of the absence of the processing abnormality in the processing as the whole,

wherein said substrate processing apparatus discharges a cleaning solution and thereafter discharges pure water onto a rotating substrate to perform cleaning of said substrate,

wherein said collection part monitors and collects the plurality of control elements in a cleaning solution spread step in which said cleaning solution is discharged and spread to coat the

rotating substrate, and

wherein said abnormality detection part detects a processing abnormality in said cleaning based on a combined effect of two or more of said plurality of control elements in said cleaning solution spread step, the plurality of control elements including the number of revolutions of a substrate, the temperature, flow rate and concentration of the cleaning solution, and cleaning solution discharge time.

41. - 42. (Cancelled).

43. (Currently Amended) The substrate processing system according to claim [[42]] 40,

wherein said collection part monitors and collects the plurality of control elements in a pure water discharge step in which pure water is discharged onto the rotating substrate, and

wherein said abnormality detection part detects a processing abnormality in said cleaning based on a combined effect of two or more of said plurality of control elements in said pure water discharge step, the plurality of control elements including the number of revolutions of a substrate, the flow rate of pure water and pure water discharge time.

44. (Previously Presented) The substrate processing system according to claim 43,

wherein said cleaning solution is a polymer removal solution,

wherein said substrate processing apparatus discharges said polymer removal solution and thereafter discharges pure water onto the rotating substrate to perform polymer removal of said substrate,

wherein said collection part monitors and collects the flow rate and discharge time of a removal solution as a plurality of control elements in a removal solution spread step in which said polymer removal solution is discharged and spread to coat a rotating substrate, and

wherein said abnormality detection part detects a processing abnormality in said polymer removal based on a combined effect of the flow rate and discharge time of said removal solution

in said removal solution spread step.

45. (Previously Presented) The substrate processing system according to claim 43,

wherein said cleaning solution is an etching solution,

wherein said substrate processing apparatus discharges said etching solution and thereafter discharges pure water onto a rotating substrate to perform etching of said substrate,

wherein said collection part monitors and collects the concentration and discharge time of an etching solution as the plurality of control elements in an etching solution spread step in which said etching solution is discharged and spread to coat a rotating substrate, and

wherein said abnormality detection part detects a processing abnormality in said etching based on a combined effect of the concentration and discharge time of said etching solution in said etching solution spread step.

46. (Previously Presented) The substrate processing system according to claim 45,

wherein said etching solution is hydrofluoric acid.

47. (Previously Presented) The substrate processing system according to claim 45,

wherein said etching solution is hydrochloric acid.

48. (Previously Presented) The substrate processing system according to claim 45,

wherein said substrate processing apparatus comprises a circulation mechanism configured to collect spent etching solution discharged once onto the substrate and to mix said spent etching solution with new etching solution for use in circulation.

49. (Previously Presented) The substrate processing system according to

claim 48,

wherein said etching solution is hydrofluoric acid.

50. (Previously Presented) The substrate processing system according to claim 48,

wherein said etching solution is hydrochloric acid.

51. (Withdrawn) A substrate processing system having coupling through a network between a substrate processing apparatus discharging a cleaning solution and thereafter discharging pure water onto a rotating substrate to performing cleaning of said substrate, and a computer collecting data from said substrate processing apparatus, said substrate processing system comprising:

an abnormality detection part for detecting a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the temperature, flow rate and concentration of a cleaning solution, and cleaning solution discharge time in said cleaning.

52. (Withdrawn) The substrate processing system according to claim 51, wherein said abnormality detection part also detects a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the flow rate of pure water and pure water discharge time in said cleaning.

53. (Withdrawn) The substrate processing system according to claim 52, wherein said cleaning solution is a polymer removal solution, wherein said substrate processing apparatus discharges said polymer removal solution and thereafter discharges pure water onto a rotating substrate to perform polymer removal of said substrate, and

wherein said abnormality detection part detects a processing abnormality in said polymer removal based on a combination of the flow rate and discharge time of a removal solution in said

polymer removal.

54. (Withdrawn) The substrate processing system according to claim 52, wherein said cleaning solution is an etching solution, wherein said substrate processing apparatus discharges said etching solution and thereafter discharges pure water onto a rotating substrate to perform etching of said substrate, and wherein said abnormality detection part detects a processing abnormality in said etching based on a combination of the concentration and discharge time of an etching solution in said etching.

55. (Withdrawn) The substrate processing system according to claim 54, wherein said etching solution is hydrofluoric acid.

56. (Withdrawn) The substrate processing system according to claim 54, wherein said etching solution is hydrochloric acid.

57. (Currently Amended) A substrate processing apparatus discharging a processing solution onto a rotating substrate to perform predetermined processing, comprising:
a collection part configured to monitor and collect a plurality of control elements in a specific step as one process of said predetermined processing; and
an abnormality detection part comprising an abnormality detection program configured to detect a processing abnormality in said processes based on a combined effect of said plurality of control elements collected by said collection part, the abnormality detection program being configured to detect that a first control element of the plurality of control elements deviates from a first reference value by an amount sufficient to determine a presence of an abnormality, and to determine an absence of the processing abnormality in processing as a whole when a second control element of the plurality of control elements deviates from a respective reference value by a predetermined amount or more and the abnormality detection program determines that effects caused by such deviations compensate each other, and
the abnormality detection program being further configured to permit continuation of the

predetermined processing by the substrate processing apparatus based on the determination of the absence of the processing abnormality in the processing as the whole,

wherein said predetermined processing is cleaning by discharging a cleaning solution and thereafter discharging pure water onto a rotating substrate to clean said substrate,

wherein said collection part monitors and collects the plurality of control elements in a cleaning solution spread step in which said cleaning solution is discharged and spread to coat the rotating substrate, and

wherein said abnormality detection part detects a processing abnormality in said cleaning based on a combined effect of two or more of said plurality of control elements in said cleaning solution spread step, the plurality of control elements including the number of revolutions of a substrate, the temperature, flow rate and concentration of the cleaning solution, and cleaning solution discharge time.

58. - 59. (Canceled).

60. (Currently Amended) The substrate processing apparatus according to claim [[59]] 57, wherein said collection part monitors and collects the plurality of control elements in a pure water discharge step in which pure water is discharged onto the rotating substrate, and

wherein said abnormality detection part detects a processing abnormality in said cleaning based on a combined effect of two or more of said plurality of control elements in said pure water discharge step, the plurality of control elements including the number of revolutions of a substrate, the flow rate of pure water and pure water discharge time.

61. (Previously Presented) The substrate processing apparatus according to claim 60, wherein said cleaning solution is a polymer removal solution,

wherein said predetermined processing is polymer removal by discharging said polymer removal solution and thereafter discharging pure water onto the rotating substrate to clean said substrate,

wherein said collection part monitors and collects the flow rate and discharge time of a

removal solution as a plurality of control elements in a removal solution spread step in which said polymer removal solution is discharged and spread to coat a rotating substrate, and

wherein said abnormality detection part detects a processing abnormality in said polymer removal based on a combined effect of the flow rate and discharge time of said removal solution in said removal solution spread step.

62. (Previously Presented) The substrate processing apparatus according to claim 60, wherein said cleaning solution is an etching solution,

wherein said predetermined processing is etching by discharging said etching solution and thereafter discharging pure water onto a rotating substrate to clean said substrate,

wherein said collection part monitors and collects the concentration and discharge time of an etching solution as the plurality of control elements in an etching solution spread step in which said etching solution is discharged and spread to coat a rotating substrate, and

wherein said abnormality detection part detects a processing abnormality in said etching based on a combined effect of the concentration and discharge time of said etching solution in said etching solution spread step.

63. (Previously Presented) The substrate processing apparatus according to claim 62, wherein said etching solution is hydrofluoric acid.

64. (Previously Presented) The substrate processing apparatus according to claim 62, wherein said etching solution is hydrochloric acid.

65. (Previously Presented) The substrate processing apparatus according to claim 62, comprising:

a circulation mechanism configured to collect spent etching solution discharged once onto the substrate and to mix said spent etching solution with new etching solution for use in circulation.

66. (Previously Presented) The substrate processing apparatus according to claim 65, wherein said etching solution is hydrofluoric acid.

67. (Previously Presented) The substrate processing apparatus according to claim 65, wherein said etching solution is hydrochloric acid.

68. (Withdrawn) A substrate processing apparatus discharging a processing solution and thereafter discharging pure water onto a rotating substrate to perform cleaning of said substrate, comprising:

an abnormality detection part for detecting a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the temperature, flow rate and concentration of a cleaning solution, and cleaning solution discharge time in said cleaning.

69. (Withdrawn) The substrate processing apparatus according to claim 68, wherein said abnormality detection part also detects a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the flow rate of pure water and pure water discharge time in said cleaning.

70. (Withdrawn) The substrate processing apparatus according to claim 69, wherein said cleaning solution is a polymer removal solution, wherein said substrate processing apparatus discharges said polymer removal solution and thereafter discharges pure water onto a rotating substrate to perform polymer removal of said substrate, and

wherein said abnormality detection part detects a processing abnormality in said polymer removal based on a combination of the flow rate and discharge time of a removal solution in said polymer removal.

71. (Withdrawn) The substrate processing apparatus according to claim 69, wherein said cleaning solution is an etching solution,

wherein said substrate processing apparatus discharges said etching solution and thereafter discharges pure water onto a rotating substrate to perform etching of said substrate, and wherein said abnormality detection part detects a processing abnormality in said etching based on a combination of the concentration and discharge time of an etching solution in said etching.

72. (Withdrawn) The substrate processing apparatus according to claim 71, wherein said etching solution is hydrofluoric acid.

73. (Withdrawn) The substrate processing apparatus according to claim 71, wherein said etching solution is hydrochloric acid.

74. (Withdrawn) The substrate processing apparatus according to claim 71, comprising:
a circulation mechanism for collecting a spent etching solution discharged once onto a substrate to mix said spent etching solution with a new etching solution for use in circulation.

75. (Withdrawn) The substrate processing apparatus according to claim 74, wherein said etching solution is hydrofluoric acid.

76. (Withdrawn) The substrate processing apparatus according to claim 74, wherein said etching solution is hydrochloric acid.

77. (Withdrawn) A program for a computer included in a substrate processing apparatus discharging a cleaning solution and thereafter discharging pure water onto a rotating substrate to perform cleaning of said substrate,
wherein execution of said program by said computer causes said substrate processing apparatus to detect a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the temperature, flow rate and concentration of a cleaning solution, and cleaning solution discharge time in said cleaning.

78. (Withdrawn) A computer-readable recording medium recording a program for a computer included in a substrate processing apparatus discharging a cleaning solution and thereafter discharging pure water onto a rotating substrate to perform cleaning of said substrate, wherein execution of said program by said computer causes said substrate processing apparatus to detect a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the temperature, flow rate and concentration of a cleaning solution, and cleaning solution discharge time in said cleaning.